Should Acropora spp. be included on the Endangered Species List?

A Coral-List Server Discusion Thread

This message was posted to the Coral List Server by Tom Hourigan. It started a lengthy and interesting discussion. All of the messages dealing with Acropora's endangered status follow. Many of the writers included a previous message in their messages. For simplicity, the included messages have been replaced by a link to the previous message that was quoted. If you follow that link, moving back in your browser should bring you back to your original position. This should continue to work even if you download the document to your machine. If you have any difficulties navigating this document, send a message to the CHAMP WebMaster.

From: Tom Hourigan <Tom.Hourigan@noaa.gov>
To: coral-list@coral.aoml.noaa.gov <coral-list@coral.aoml.noaa.gov>
Subject: Acropora spp. - Candidates for Endangered Species List
Date: Tuesday, February 16, 1999 9:50 PM

Dear Coral List,

In the U.S. Federal Register Notice January 15, 1999 (Volume 64, Number 10), the National Marine Fisheries Service (NMFS) requested information on marine Candidate Species for listing under the U.S. Endangered Species Act. This notice is not a proposal for listing; candidate species do not receive substantive or procedural protection under the Endangered Species Act. The goal of the candidate species program is to identify species as candidates for possible addition to the List of Endangered and Threatened Species and encourage voluntary efforts to help prevent listings. The full text of the Federal Register notice can be found on the web at: http://www.access.gpo.gov/.

ACROPORA SPECIES AS CANDIDATES FOR THREATENED OR ENDANGERED SPECIES:

In this Notice, NMFS has proposed to add two coral species, elkhorn coral (*Acropora palmata*) and staghorn coral (*Acropora cervicornis*) as candidates for possible addition to the List of Endangered and Threatened Species under the Endangered Species Act (FR Doc. 99-1011, 1-15-99). These two species were among the dominant corals in shallow-water Caribbean reef communities. During the last two decades, it appears that populations of A. cervicornis and A. palmata have been greatly reduced throughout their range as a result of hurricane damage, coral diseases, increased predation, hypothermia, boat groundings, sedimentation, and other factors. Losses are well documented at several sites in U.S. waters, where populations declined during the 1980s by up to 96%. To date, acroporid corals have not recovered to their former abundance, and remaining populations may continue be deteriorate from natural and anthropogenic factors. The observed low rates of larval recruitment may hinder recovery of

these species, given continuing losses from coral diseases, predators, storms and human impacts.

To be listed under the Endangered Species Act, invertebrates must be shown to be threatened throughout the range of the species (in contrast to vertebrates, which can be listed based on specific populations or the status in U.S. jurisdiction).

NMFS would appreciate any information on these species that would support or argue against inclusion on the candidate species list. Such information could include historic and current population sizes and distribution, assessments of threats, and existing and future protective measures that may assist to recover these species before listing under the ESA becomes necessary.

OTHER CORAL SPECIES

We have also examined several other western Atlantic coral species that might merit inclusion as Candidate species. They were not included in the Federal Register Notice since the information available was incomplete. They include:

- *Acropora prolifera*
- *Dendrogyra cylindricus* - pillar coral
- *Dichocoenia stokessi*
- *Oculina varicosa*

Other species, such as the *Porites porites* complex, *P. astreoides*, the *Montastraea annularis* complex, *M. cavernosa*, *Diploria strigosa*, *D. clivosa*, and *D. labyrinthiformis* appear to have undergone some declines at certain sites, but do not appear as threatened as the *Acropora spp*, at this time.

We welcome any discussion and comments members of the coral list may have on the inclusion of these or other coral species on the candidate species list. Formal comments shold be sent to the Chief of the Endangered Species Division in NMFS' Office of Protected Resources at the address listed below.

Thanks for your help!

Tom Hourigan

Thomas F. Hourigan, Ph.D
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From: **Bob Steneck** <Steneck@maine.maine.edu>

To: "Tom Hourigan" <Tom.Hourigan@noaa.gov>, "Coral List" <coral-list@coral.aoml.noaa.gov>
Subject: Re: Acropora spp. - Candidates for Endangered Species List
Date: Sat, 20 Feb 99 12:46:36 -0500

Dear Tom,

It seems to me that the Acropora decline throughout the Caribbean may qualify that genus and all of its species to endangered status. I have seen some recent declines in Porites and to a lesser extent Dichocoenia but some of the other species you have listed I do not think qualify. Most notably is Dendrogyra cylindricus. While I know of no region or reef in the Caribbean where it has ever been abundant, it is remarkably common. Most reefs have a little of that species and most areas I've worked throughout the Bahamas, eastern and western Caribbean seem to have healthy colonies. I suspect you do not want a list of corals that happen to have always had low abundance.

It will be relatively easy to query the Atlantic and Gulf Reefs Rapid Assessment data sets to see if higher than average mortality rates are showing up for the species you list below (see: http://coral.aoml.noaa.gov/agra/agra1.html). In April many of us will be assembling in Fort Lauderdale to present data on the condition of Caribbean reefs, perhaps you could get a consensus of opinions at that time (see: http://www.nova.edu/ocean/ncri/cfp_1.html).

Good luck in your efforts.

Bob Steneck

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>merit inclusion as Candidate species. They were not included in the Federal
>Register Notice since the information available was incomplete. They
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From: "**CORALations**" <corals@caribe.net>
To: "Coral-List" <coral-list@coral.aoml.noaa.gov>
Subject: Re: Acropora spp. - Candidates for Endangered Species List
Date: Mon, 22 Feb 1999 09:58:48 -0400

Based on what we know about the interconnectedness of species in such an ecosystem, how can we still be selecting individual species for protection and ignoring others...For example..saying Acropora would qualify as endangered due to declines throughout the Caribbean does not provide sollutions for impacts to other species of coral that result from this decline. Could reef scientists possibly make rational arguments for considering the entire ecosystem as endangered ...including commercially valuable fish and shellfish which play a role in nutrient distribution and recycling etc.?

It seems that the way these systems have evolved is more complicated than mere % distributions of individual species and if we are going to spend time and energy trying to protect them could we possibly shoot for a legislative solution which effectively recognizes this? I have concerns about scientists becoming too conservative in the manner in which they convey impacts to the reef in an effort to propell small, less constroversial solutions to society when these solutions may simply not be effective. Look how we've bungled and continue to bungle marine fishery legislation in order to propell small paletable bits of legislation often too little, too late...rarely complied to or enforced.

"The problems we have today, will not be solved by thinking the way we thought when we created them".... Albert Einstein

Note: *The writer at CORALations had Steneck's entire message in the original message. Steneck's message is just above.*

From: "**Judith Lang** & Lynton Land" <JandL@rivnet.net>
To: "Coral-List" <coral-list@coral.aoml.noaa.gov>
Date: Mon, 22 Feb 1999 11:13:39 -0500
Subject: Candidates for Endangered Species List

Re: the message from CORALations:
In fact an ecosystem approach to species conservation has been our theoretical underpinning since about 20 years ago when the Gulf of Mexico and South Atlantic Fishery Management Councils collaborated on a Fishery Management Plan for Coral and Coral Reefs. The "management unit" here was defined as being composed of about 400 species of fire corals, soft corals, gorgonians, black corals and stony corals. At the time, declaring that its maximum sustainable yield was "incalculable", and that its principal value was in "nonconsumptive uses" certainly was an unusual approach to fishery management!

By and large "management for conservation" is working at what is now the Flower Garden Banks

National Marine Sanctuary (where, incidentally, all types of fishing except with hook-and-lines has also been prohibited since 1992). Stony corals have shown no significant changes in cover, species diversity, species evenness or growth rates since the early 1970's, despite their location near active petroleum platforms in the Northwestern Gulf of Mexico [see review of SR Gittings, TJ Bright and DK Hagman, 1994, pp. 181-187 in RN Ginsburg, (compiler), Proc. Colloquium on Global Aspects of Coral Reefs: Health, Hazards and History].

Sadly, the subsequent history of many reefs in the Florida Keys, where both natural and anthropogenic stresses are considerably greater than 200 km offshore Texas, has been less fortunate. Hence, it seems to me that we should continue to CREATIVELY invoke all available legal options --including the endangered species act, with its provisions for habitat acquisition/protection/restoration --as surely, in the long run, that will only help conserve coral reefs and associated ecosystems.

Judy Lang

Note: *Judy Lang had CORALations message in her original message. CORALations message is just above.*

From: **Sean Lyman** <sjl3@duke.edu>
To: CORALations <corals@caribe.net>
cc: Coral-List <coral-list@coral.aoml.noaa.gov>
Subject: Re: Acropora spp. - Candidates for Endangered Species List
Date: Mon, 22 Feb 1999 11:02:24 -0500 (EST)

Good morning:

The CORALations folks bring up a good point about classification of the entire coral reef system as endangered, but I think it's a mistake to so quickly dismiss listing of a single species. I do not disagree with their points, but I do think that listing and protection of a single species can be useful.

Doing what is necessary to protect a single species (or genus) or coral is going to have a positive effect on the entire system, something I've heard referred to as an "umbrella" of protection. The Endangered Species Act in the US certainly has problems, but the listing and protection of charismatic megafauna has often had trickle-down effects on equally-endangered ecosystems in which they live.

I think that we are a long way from the political power to implement an endangered communities act, and therefore should not be shy about using the tools at our disposal. Declaring Acropora as endangered will increase awareness about the decline of the coral reef ecosystems, and steps taken to protect Acropora will most likely benefit at least other corals and at best the entire system.

Cheers,
Sean

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From: "**Causey, B.**" <bcausey@ocean.nos.noaa.gov>
To: "CORALations" <corals@caribe.net>, "Sean Lyman" <sjl3@duke.edu>
Cc: "Coral-List" <coral-list@coral.aoml.noaa.gov>
Subject: RE: Acropora spp. - Candidates for Endangered Species List
Date: 23 Feb 1999 11:32:39 -0500

Some food for thought:
Although I am supportive of listing Acropora spp for all the reasons that have been discussed over the past week or so, I too have some comments. The only reason I mention this here is that a few of the comments such as the one from Sean raise some good points about a community approach to protection.

Due to the wide range of threats and many issues facing South Florida, EPA and the USFWS have been developing a Multi-species Recovery Plan instead of using the ESA in a species by species approach. We have in the neighborhood of 82 species of threatened or endangered species and the USFWS has produced a draft plan to comprehensively look at the problems.

I agree that we should move forward with this listing of Acropora spp to heighten the protection, thus the awareness that there is a serious problem throughout the range of this genus in the Atlantic and Caribbean, but realize that a long-range goal of a multi=species approach should be kept in mind.
Cheers, Billy Causey

Note: *Causey had Sean Lyman's whole message in his original message. Lyman's message is just above.*

From: "**CORALations**" <corals@caribe.net>
To: "Coral-List" <coral-list@coral.aoml.noaa.gov>
Subject: Fw: Acropora spp. - Candidates for Endangered Species List
Date: Tue, 23 Feb 1999 14:52:01 -0400

Dear Dr. Precht:

I apologize to you and others on the list if what I wrote was not clear...I did not mean in any way to imply that we should abandon the endangered species act or any other legal avenue of protection people have struggled for years to establish in order to embrace what you described as a "shot gun" approach to coral reef conservation. Further, when I was referring to the interconnectedness of species in such an ecosystem I was not only referring to other coral species, but other reef associated species of plants and animals.

The point on which I was trying generate a professional discussion stems from ever increasing frustrations in finding "real time" solutions to coral reef conservation problems. I posed the question...could another more holistic approach to reef conservation legislation be argued at this time.....based on what scientists have documented about the interdependence or interconnectedness of species within this ecosystem?

Am I correct in interpreting your response to this question as "no" when you wrote:

"Well, I think the data tend to argue against these systems being interconnected (i.e. tightly integrated) "

By systems, do you mean species within the system? If I am interpreting this correctly, it contradicts what I understand about the co-evolution of species within ecosystems and the importance of conserving species biodiversity. This is of concern to me since this is what I attempt to convey as a "grass roots" educator to the general public about reef systems. Please clarify if I am misinterpreting your comment...it may well have been meant only in relation to Acropora and the lack of data supporting any connection between the decline of other coral species in relation to Acropora declines. Any information you, or anyone on the list can send, is always greatly appreciated.

Thanks to the Langs who wrote:

"In fact an ecosystem approach to species conservation has been our theoretical underpinning since about 20 years ago when the Gulf of Mexico and South Atlantic Fishery Management Councils collaborated on a Fishery Management Plan for Coral and Coral Reefs. The "management unit" here was defined as being composed of about 400 species of fire corals, soft corals, gorgonians, black corals and stony corals. At the time, declaring that its maximum sustainable yield was "incalculable", and that its principal value was in "nonconsumptive uses" certainly was an unusual approach to fishery management!"

I had no idea this approach was being taken with any FMP.....let alone 20 years ago and plead ignorant!

Dr. Precht also wrote:

"Although I am in agreement with you that both corals and coral reefs need vigilant protection because they are all at some level of risk, especially at the hands of man coupled with natural disturbances".

I believe we should, in the face of what may be considered time constraints on the survival of this ecosystem, carefully scrutinize past conservation management failures and keep our minds open to innovative and more aggressive practices. Please don’t think this statement reflects ignorance about social pressures which govern reef and fish legislation, however, these comments come from Puerto Rico where fishermen from the municipal island of Culebra have been requesting the government establish a Marine Fishery Reserve since 1980 and although final legislation has been drafted for over a year and a half...still awaits final approval from the local government.

If the cost to society is the entire ecosystem...maybe we could justify the discussion of more aggressive or comprehensive management strategies? I have trouble defining the pursuit of any legislative action as being "a shot gun approach" as you stated. Legislative channels often take time and are open for meaningful public participation in the form of public hearings etc.....at least they are where you live.

Indeed, the broad definition given to coral reef ecosystem in Clinton’s executive order 13089, must be at

least some cause for concern to the many "hired gun" consultants whose job it appears is to protect big business and government from the added expense of functioning in an environmentally responsible manner.

We should, however, pay close attention and note if even this broad definition given to coral reef ecosystems can effectively be used to contribute to the conservation of these marine systems? For example, much of the money or re-allocation of federal funds associated with this executive order is being focused on mapping and monitoring. Should we be concerned that 20 years from now, scientist may be reviewing what may then be historic information of where the living reefs once were? Should we be concerned that in 20 years scientists may be discussing how hard they "tried" to conserve these systems through the rationalization that the first step must be lengthy mapping and monitoring? Will there be any satisfaction in clearly and empirically demonstrating that these systems were in fact destroyed by multiple anthropogenic stressors ?

Do current approaches to coral reef conservation management and associated fund allocation warrant closer evaluation with respect to their potential effective contribution toward meeting conservation related objectives given the rate of system degradation? Could not this money be better spent addressing, for example, more controversial water quality issues?

Sincerely,

Mary Ann Lucking
Project Coordinator
CORALations
Amapola 14, Suite 901
Isla Verde, PR 00979
787-791-7372
corals@caribe.net

> From: Precht,Bill <BPrecht@kennesaw.Lawco.com>
> To: corals@caribe.net
> Subject: FW: Acropora spp. - Candidates for Endangered Species List
> Date: Monday, February 22, 1999 3:20 PM
>
>
> CORALations:
>
> I read with great interest your note to Tom H. regarding the inclusion of
> Acropora and exclusion of other coral species on the E&T Species list.
>
> You state "based on what we know about the interconnectedness of species
> in such an ecosystem" that we need to look at more than just the
> acroporids, even at the ecosystem as a whole.
>
> Well, I think the data tend to argue against these systems being
> interconnected (i.e. tightly integrated) -
>
> The Caribbean wide demise of acroporids over the last two decades has not
> been related to the collapse of other coral species. In cases where other

> corals have declined, it has been for other reasons not related to the
> mortality of the acroporids (white-band disease epizootic and related
> necrosis). The data clearly show the acroporids to be at risk. This is
> not so for all coral species in the Caribbean/western Atlantic. The
> reproductive strategy (poor sexual recruitment success) will not help the
> acroporids recover anytime soon.
>
> I believe it is
> not prudent or a best management practice to use your shotgun approach
> listing the whole ecosystem as endangered. Local extirpation of the
> acroporids has already occurred in some populations and there is a serious
> risk that in the face of continuing disturbances that we may lose the
> whole lot. I would love to discuss this in greater detail if you would
> like. I will send you a copy of some recent publications that I hope you
> may find interesting....
>
> Sincerely yours,
>
> Bill
>
> William F. Precht
> Natural Resources Manager
> LAW Engineering & Environmental Services, Inc.
> 5845 NW 158th Street
> Miami Lakes, FL 33014
> ph (305) 826-5588 x206
> fax (305) 826-1799

Note: *In Bill Precht's quoted message was CORALations' original message. CORALations' original message appears above.*

From: **kenyon mobley** <kenyon_b_mobley@gasou.edu>
To: "coral-list" <coral-list@coral.aoml.noaa.gov>
Subject: ESA
Date: Tue, 23 Feb 1999 17:03:18 -0500

Food (or fodder) for thought about the endangered species act vs. ecosystem approach.

Published Saturday, February 20, 1999, in the Miami Herald

Scientists sound the alarm for rare, tiny marine critter Is there room for lowly, microscopic marine critters on the marquee list of America's endangered species, next to the popular manatees, Florida panthers and bald eagles?

A coalition of scientists and conservationists is calling the question. They are asking the federal government to grant endangered species status to 11 species and a new genus of bryozoans found nowhere else but on a large sand bar off St. Lucie County.

The marine animals are in immediate danger of extinction, their advocates say, because the Army Corps of Engineers plans to mine sand from Capron Shoal, where they live, to widen 2.3 miles of beach south of Fort Pierce Inlet.

The $6.3 million project is expected to start late next week -- unless the National Marine Fisheries Service, which lists endangered marine plants and animals, steps in.

The service must step carefully. Listing the bryozoans could have implications for other beach-building projects that Florida uses to pump up its prime tourist draws.

But not considering them for protection might violate one of the nation's most important environmental laws, says attorney Eric Glitzenstein, who represents the bryozoans' advocates.

Quoting the *Endangered Species Act*, he says: "From the narrowest point of view, it is in the best interest of mankind to minimize the losses of genetic variations. . . . They are potential resources. They are keys to puzzles which we cannot solve, and may provide answers to questions which we have not yet learned to ask.

A bryozoan is a tiny, invertebrate marine animal that can live its entire life on a single grain of sand.

Judith Winston, who co-discovered the Capron Shoal bryozoan colonies 14 years ago with a scientist from Denmark, argued in a letter to the fisheries service that the species will become extinct -- and with them the chemical secrets she says might help battle cancer.

"These unique bryozoans belong to the same order taxonomically as the bryozoan species which is the source of a potent anti-cancer agent, Bryostatin 1, wrote Winston, the research director at the Virginia Museum of Natural History. "Bryostatin 1 derives from the bryozoan Bugula species . . . which is also present in the currently rich biotic community of Capron Shoal.

"The medicinal properties of the newly discovered bryozoans have not yet been explored, and if the species do not receive emergency listing protection, the opportunity to conduct such research may be lost forever.

There are about 5,000 species of bryozoans, whose name means "moss animals. In his book, Land From the Sea: The Geologic Story of South Florida, marine scientist John Edward Hoffmeister says bryozoans grow together to form knobby colonies that can be a foot or more in diameter. They are higher on the scale of life than corals, he says, but not anywhere near as pretty.

Winston, fellow scientist Brian Killday, the St. Lucie County Audubon Society, the St. Lucie Waterfront Council and the St. Lucie County Conservation Alliance asked the fisheries service and its parent, the Department of Commerce, on Feb. 11 for the emergency listing for bryozoans.

The listing would be temporary, lasting up to 240 days -- or long enough for the federal

agency to determine whether or not the species warrant inclusion among 40 plants and animals listed by the fisheries service as endangered or threatened. The proposal asks that the corps not begin dredging until the service decides on the emergency listing request.

Gordon Helm, service spokesman, said the agency was studying the request, which he described as difficult to evaluate given the size of the species in question and complications of searching for it on other shoals.

The corps of engineers, meanwhile, overlooked the bryozoans entirely in its planning. Jacqueline Griffin, spokeswoman for the corps' Jacksonville district, said the agency had "no knowledge of the bryozoans when the project began.

When scientists and conservationists pointed out the omission of the bryozoans, the agency responded: "The effect on these and other species inhabiting the shoal should be minimal.

Winston says the corps' response rests on sheer speculation since scientific research has never been conducted to find these particular bryozoans on other shoals nearby. She has found them only on the shallowest part of Capron, where the corps plans to dredge.

And fellow researcher Eckart Hakansson of Denmark has never seen those species in his work in the Caribbean, Philippines and Australia.

"Whether or not bryozoans exist elsewhere . . . is an important question that must be answered before [the corps] begins dredging the only known habitat of these unique organisms, she wrote.

Of course, many people scoff at the idea of holding up a multimillion-dollar beach-building project while scientists search for bryozoans, but ecologists who've dedicated their careers to preserving biodiversity say that the lowliest deserve protection.

"Some of these tiny, unloved marine organisms are proving hugely important in the pharmaceutical industry for the compounds they're finding there, said Stuart Pimm, a prominent University of Tennessee scientist.

"And that's only one reason to protect these animals. The other is that they're found only in one place. By that, they're telling us that something unique, special and wonderful is going on there.

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From: "**Bruce Carlson**" <carlson@soest.hawaii.edu>
To: "Sean Lyman" <sjl3@duke.edu>, <"CORALations" corals@caribe.net>
Cc: "Coral-List" <coral-list@coral.aoml.noaa.gov>
Subject: Re: Acropora spp. - Candidates for Endangered Species List
Date: Tue, 23 Feb 1999 13:48:38 -1000

I would like to note that several public aquariums are raising Acropora cervicornis in captivity with excellent results (the Florida Aquarium has some in their coral exhibit and it has grown considerably in the past year). I certainly hope that the means will be found to keep A. cervicornis and A. palmata alive and well in their natural environments, but if it really appears that they are heading towards extinction, it would probably be worthwhile for a few public aquariums to maintain some "genetic diversity" in aquariums, for possible reintroduction to the wild when conditions improve. Based on what we know about keeping Acropora spp. in aquariums, they could probably be maintained almost indefinitely, especially if enough institutions maintain them.

We have considered this here in Hawaii to include A. cervicornis among our collection of Pacific acroporids, but we are very reluctant to bring in any Caribbean species that might accidentally also bring in a pathogen (if indeed that is what is causing the problem in the Caribbean). If public aquariums get involved, it will have to be those on the mainland U.S.

Just an option for consideration, but a viable option nonetheless.

Bruce Carlson
Waikiki Aquarium

Note: *Carlson had Lyman's message in his original message. Lyman's message is already displayed above.*

From: **Reef Relief** <reef@bellsouth.net>
To: coral-list <coral-list@coral.aoml.noaa.gov>
Subject: Acropora palmata discussions/coral nursery
Date: Thu, 25 Feb 1999 16:03:47 -0500

Reef Relief has released the first year report on the Coral Nursery Project at Western Sambo Reef in the Florida Keys. The report outlines the efforts to stabilize loose fragments of Acropora plamata onto "Acropora rosettes", a design by restoration biologist Harold Hudson, in this cooperative project with the Florida Keys National Marine Sanctuary. Storm-damaged fragments of Acropora palmata were secured with hydraulic cement onto concrete landscaping pads.

The effort was launched to save Acropora palmata that was becoming increasingly rare in Keys waters after substantial damage to populations at Western Sambo Reef as a result of the Ground Hog Day Storm of February 1998.

The rosettes were not cemented down at first because the plan was to move them to a boat grounding site. As a result, they were damaged during Hurricane Georges but quickly re-established by a Reef Relief team led by Craig Quirolo. This time, they were cemented to the ocean floor and survived through Tropical Storm Mitch. Unfortunately, Acropora palmata colonies at Western Sambo, Rock Key and other Keys reefs suffered substantial losses as a result of these successive storms.

REEF RELIEF recommends and encourages the inclusion of all corals in the Acropora genus found in the Caribbean Basin for further protection, including listing through the U.S. Endangered Species Act. The health and abundance of Palmata colonies we have photo-documented in Cuba, Jamaica, and Honduras are being compromised as well.

For a copy of the 70-page color report, contact Reef Relief by e-mail, telephone (305) 294-3100, fax (305) 293-9515, or write P.O. Box 430, Key West, Fl. 33041.

The report is available on our website, located at www.reefrelief.org.

From: **Walt Jaap STP** <JAAP_W@epic7.dep.state.fl.us>
To: coral-list@coral.aoml.noaa.gov
Subject: Acropora spp., endangered
Date: Fri, 26 Feb 1999 10:07:06 GMT

[Moderator's note: this letter to Tom Hourigan from Walt Jaap was reprinted with permission from Walt for the purpose of encouraging discussion and contrasting or complementary viewpoints.]

22 February, 1999

Dear Dr. Hourigan:

I am responding to your internet request about Acropora spp. and other Scleractinian species for inclusion as endangered or threatened species. We have encountered this option several times from different groups over the years; and have looked at the option to see if it was reasonable, possible, and would it do a better job protecting corals than the existing statutes and management regimes. We have

concluded that it is not the best approach for several reasons.

Firstly, to prove that a coral is threatened or at risk throughout the Caribbean, Florida, Bahamas, Bermuda, and places in between is costly, time consuming, and might be very difficult to prove the case.

Are corals currently protected from human exploitation by other statutes and management regimes? I would like to think so. In Florida, we have a state statute that protects all Scleractinia, Millepora spp, and Gorgonia spp from harvest, being sold in a commercial establishment, and from destruction on the sea floor. This statute has been in effect since the mid 1970s. At the federal level the most extensive coral protection is found under the Magnuson Act: The Gulf of Mexico and South Atlantic Fisherie s Councils cosponsored the work that resulted in the Coral and Coral Reef Fishery Management Plan. This plan parallels the Florida statute, protecting the Scleractinia, Millepora spp, and Gorgonia spp. This management regime was recently incorporated into the Essential Fish Habitat Plan by the Fishery Management Councils.

The Department of Interior manages two National Parks (Biscayne and Dry Tortugas) in which all corals are protected. The State of Florida and NOAA are the trustees of the Florida Keys National Marine Sanctuary which includes all the reefs outside the National Park boundaries from Fowey Rocks to west of Dry Tortugas, again the regulations protect corals and reefs. When anthropogenic events occur, the trustees have successfully prosecuted responsible parties or have negotiated effective restoration and mon itoring plans on the sites. Settlements were in the range of millions of dollars. Would the endangered species act have provided immunity from these anthropogenic disturbances? I do not think it would have.

Natural events such as hurricanes, ENSO related bleaching episodes, and global warming are still occurring in spite of the efforts that the coral protection statutes and management regimes. Would additional protective legislation such as the endangered species program provide more protection to the reef resources? I am skeptical that adding a few Scleractinia corals to the endangered and threatened species list would be of benefit.

Coral populations are very dynamic. In the case of Acropora palmata (Lamarck, 1816) there is good evidence that it has gone through boom and bust dynamics for quite some time. In 1882, Alexander Agassiz reported 44 hectares of A. palmata at Dry Tortugas. In 1982, Gary Davis reported that, A. palmata coverage declined to 0.6 hectares, ten years later we measured the remnant population and noted little change. The decline was probably caused by hurricanes and other meteorological phenomena.

In retrospect, or as they claim hind sight is perfect, when the debate over the Everglades Park boundaries was first debated in the late 1940s, Gill Voss told me an initial proposal had all of the Florida Keys with the exception of Key West and Marathon included in Everglades National Park. Local politics prevailed and the end result is a highly urbanized Florida Keys in which the environmental quality has suffered from user abuse. Ah, if we could only go back in time and make it right.

We recognize that your intentions are well meaning and appreciate your concern. We respectfully disagree that the corals mentioned in your communication should be considered for nomination as endangered or threatened species. We do not believe that any of the aforementioned taxa of corals could satisfy the criteria of endangered or threatened species. Since we have existing statutes and management regimes that are designed to protect corals and reefs, the proposed status would have little or no effect o n these resources.

Sincerely

Walter C. Jaap Associate Research Scientist Florida Marine Research Institute

---

From: **Susan White** <susan_white@mail.fws.gov> To: coral-list@coral.aoml.noaa.gov
Subject: More on ESA candidate spp.
Date: Thu, 25 Feb 1999 09:25:30 -0700

At the risk of beating a dead horse, may I add one more thought into the Endangered and Threatened Acropora 'listing' discussions....

Managing for E & T species, by law, is more than just the individual. The habitat that the species depends upon is a critical part of the protection. There are thousands of species (marine and terrestrial) that deserve listing because they are imperiled. Most of these species are imperiled because of anthropogenic factors, including loss of habitat or habitat degradation. With the current strong U.S. agency focus on ecosystem management -- as opposed to species management -- if a select few representative species are 'listed' and recovery actions are taken to protect the habitat and larger environment of those species; then all the other species within the habitat also benefit. That is why the concept of indicator and keystone species are so useful.

It's a round about way of getting the whole system, and there are loopholes, but it can go a long way for establishing the imperiled status of the reefs.

/s/ Susan

Susan White
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Florida Keys National Wildlife Refuges
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Big Pine Key, FL 33043
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fx: 305.872.3675
email: susan_white@fws.gov

From: "**CORALations**" <corals@caribe.net>
To: "Walt Jaap STP" <JAAP_W@epic7.dep.state.fl.us>, <coral-list@coral.aoml.noaa.gov>
Subject: Re: Acropora spp., endangered
Date: Fri, 26 Feb 1999 12:18:41 -0400

Dear Mr. Jaap:

You wrote: " We do not believe that any of the aforementioned taxa of corals could satisfy the criteria of endangered or threatened species."

Can someone discuss this criteria or possibly scan and post? How does this designation differ from appendix II listing?

You wrote: "Firstly, to prove that a coral is threatened or at risk throughout the Caribbean, Florida, Bahamas, Bermuda, and places in between is costly, time consuming, and might be very difficult to prove the case."

Does this mean there is no data backing compliance to ES criteria for the taxa listed? I was under the impression that this discussion originated based on evidence which suggests they fit the criteria. Are reefs considered “shared resources” in these regions with respect to such legislation? Would, for example, a disease diagnosed in one region resulting in extensive mortality of a species of coral be enough of a cause for concern to protect the same species in other regions given that these diseases are distributed by currents, or are you saying extensive monitoring is required in each specific region? In other words, at this point in time, how much investigation actually needs to be done in order to see if criteria are met and to what regions would the protection apply? You wrote: "Are corals currently protected from human exploitation by other statutes and management regimes? I would like to think so."

I would like to think so too. Unfortunately, don't corals continue to decline in large part due to anthropogenic stressors? The big picture is we don't seem to be "managing" our selves very well. We can't even manage trade, let alone less direct impacts from run off etc.... Look, for example, at the large black coral galleries on St. Thomas, Cayman and Las Vegas. There's a two page magazine add that reads like a documentary in American Skies, the American Eagle magazine promoting this "art." How are permits allocated for such exploitation with so little knowledge about the "protected" species? In St. Thomas, the existence of this well publicized gallery has encourage neighboring shops to engage in the trade. Many fishermen in the DR are risking their lives to harvest this coral. My only concern about using endangered species act to protect coral is that the response to the question you posed: "Are corals currently protected from human exploitation by other statutes and management regimes? would be answered as casually with "I would like to think so, they're considered endangered species."

You wrote: "Would the endangered species act have provided immunity from these anthropogenic disturbances? Although, I believe you are specifically referring to groundings when you discuss "anthropogenic events" what about development related stress? Has the endangered species act been used to stop development? With respect to groundings, could the endangered species act be used to create legislation which diverts tanker traffic away from sensitive coral reef areas, minimizing future groundings and tanker related accidents? Has endangered species act ever been used to improve water quality?

You wrote: "Natural events such as hurricanes, ENSO related bleaching episodes, and global warming are still occurring in spite of the efforts that the coral protection statutes and management regimes. Would additional protective legislation such as the endangered species program provide more protection to the reef resources?"

I believe the answer to this depends on the proposed protective legislation. We should be using past management failures to discuss additional protective legislation. With regard to the endangered species act, I would think we can use this as another tool to minimize additional anthropogenic stress to protected corals from proposed development and water quality issues. Your “natural events” argument better defends why we should do more....not eliminate a legislative avenue that already exists.

You wrote: Coral populations are very dynamic. In the case of Acropora palmata (Lamarck, 1816) there is good evidence that it has gone through boom and bust dynamics for quite some time.

Are you suggesting that no anthropogenic stressors are currently contributing to the decline of this species?

I respect you for posting your arguments to the web for discussion. I also have concerns about the effectiveness of the endangered species act to protect corals. To many people, corals are just rocks, or rocks with worms. However, unlike you, I see this as a cause for concern to open discussion about more aggressive comprehensive legislation, not grounds for abandonment of laws currently on the books. Other listers have commented that by protecting one species of coral others will benefit. In my opinion, the strongest argument you present is cost - benefit. However, I feel your cost-benefit argument fails if a substantial amount of data exists which can be used to demonstrate compliance with ES criteria and other corals benefit by proximity to the species being listed.

Sincerely,

Mary Ann Lucking
Project Coordinator
CORALations
Amapola 14, Suite 901
Isla Verde, PR 00979
phone/fax: 787-791-7372
corals@caribe.net

Note: *Lucking had Walt Jaap's whole message in her original message. Jaap's message appears above.*

From: **Fabrice POIRAUD-LAMBERT** <fpl10@calva.net>
To: Reef Relief <reef@bellsouth.net>, <coral-list@coral.aoml.noaa.gov>
Subject: Re: Acropora palmata discussions/coral nursery
Date: Fri, 26 Feb 1999 19:09:42 +0100 (MET)

Hi,

Reef Relief Document and Initiative is really interesting according to me, and I think it should be extended to Maldives and other heavily damaged reefs : I'm just coming back from Maldives, and it's really incredible=> 95% of coral coverage as been killed and SPS / LPS corals have deseappered totally in most reefs!

Many colonies has been broken and turned up side down (it happened that I returned 4 still alive Tabular Acropora in less than 10 minutes), and many frags are lying in the sand, dying.

SPS and LPS are now very rare in many Maldives Reefs, and I strongly feel that Local Professional Divers and volonteers could help in returning Colonies and using fragments to re-colonize bleached reefs, If it's not too late.

Rgds

Fabrice POIRAUD-LAMBERT

Note: *Poiraud-Lambert had Reef Relief's message in his original message. Reef Relief's message appears above.*

From: **Bob Steneck** <Steneck@maine.maine.edu>
To: "Walt Jaap STP" <JAAP_W@epic7.dep.state.fl.us>, "Coral List" <coral-list@coral.aoml.noaa.gov>
Subject: Re: Acropora spp., endangered
Date: Fri, 26 Feb 99 13:46:37 -0500

Dear Walt and others,

Isn't the ultimate result of your argument that management cannot do much for coral decline, so why bother? Or perhaps everything that needs to be done is being done in Florida so let's be patient. However, the idea that we just don't know enough will always be used in all management issues. If we cannot make a good case for an Acropora decline throughout the Caribbean, can we ever hope to make a case to managers or legislators that will work for other issues?

I hope you see that I'm not directly disagreeing with anything you have said. However working with existing legislation... especially legislation that has some real 'teeth' as is the case for Endangered Species Act, makes sense to me. It seems to me that endangered species may become the 'poster-child' for an educational campaign and I see value in that. Protection of endangered species translates to protection of associated species and the entire local system. For example, the spotted owl has saved lots of old growth forests. There are many other examples.

Finally, is there harm in embracing the concept of Acropora meeting the definition of an endangered or threatened species? As far as I can see, only if the science doesn't support it. As you know, there are volumes of studies both qualitative and quantitative that document the Acropora decline. There is a sizable literature arguing for the geological and ecological importance of that genus. Even if there is evidence that this genus has fluctuated in the past (I'm not sure yours is a good example... it suggests the Acropora decline may have begun earlier than we thought), I don't think that should disqualify it from being considered for E & T classification. I also do not think the long-term prognosis for the species has to be good for inclusion to the list. I believe everyone expected the California Condor would go extinct but it was placed on the list anyway. I think that species has surprised some pundits.

Walt - I hope I'm not missing some of your key points as to why there is no value in placing acroporids on the endangered list. If I am - please educate me and everyone else. If the scientific community sees general value, there is a slim chance this could happen. At best, this is a long-shot that might help protect some reefs.

Cheers,

Bob Steneck

Note: *Steneck had Jaap's message in his original message. Jaap's message appears above.*

From: **Alina Szmant** <aszmant@rsmas.miami.edu>
To: "CORALations" <corals@caribe.net>, coral-list@coral.aoml.noaa.gov
Subject: Re: Acropora spp., endangered
Date: Fri, 26 Feb 1999 17:26:04 -0500 (EST)

I have read with interest but stayed out of the fray until now, regarding the listing of Caribbean Acropora species on the endangered species list. However, the response of CORALations to Walter Jaap's posting made me have to "speak up" because it mis-interpreted much of Walt's message and made some rather inane remarks.

1) The Endangered Species Act is an American piece of legislation that is not binding in other countries. Given that most of the range of these species is outside of US jurisdiction (as opposed to the spotted owl or some such beast), inclusion of the Acropora's on the endangered list won't make all that much difference except to prevent importation of dead skeletons of the corals from places like the Dominican Republic with I think still allow harvesting and export. Harvesting of corals and dredging of coral reef habitat is not allowed in any of the US waters.

2) Walt didn't make the requirements up: the Endangered Species Act has some very specific criteria that need to be met in order to justify a species to be included on the list, not just a few people claiming that the "sky is falling" for the Acropora's. While I agree that in SOME locations there have been dramatic decreases in the abundance of these species, in OTHERS they seem to be doing fine, and in fact I've seen some hugh patches of recent Acropora palmata and cervicornis recruitment on the South coast of Puerto Rico that would refute that the species is endangered as defined by the Act. Matter of fact, until Hurricane Georges came along Sept of '98 we had some very healthy and fast growing patches of A. palmata here in the Upper Fla Keys, that were vigorous spawners and much evidence of recruitment, again refuting that the species is truly endangered. I do not know how they will recover from the hurricane and the severe state of bleaching they were in at the time the hurricane struck, and they may not recover fully here on Florida reefs immediately or even after a long time...I don't have a cristal ball... but, as Walt pointed out, until we really have the DATA that demonstrates that the specific species (a) is below reproductive/recuitment capacity in ALL it's range (and I just heard last night about great healthy stands of it in several places in the Bahamas), then they won't meet the specific guidelines to be designated as endangered species. In my opinion, based on what I've seen, theyt are not.

3) Walt never stated that CORAL REEFS shouldn't be protected, nor that water quality problems should be ignored, nor any of the other snotty comments in the CORALations message. He simply pointed out that there are numerous other routes and regulations in place other than the ESA than should be used, and in some places are being used, to protect CORAL REEF ecosystems, which in the process protect all coral species not just a favorite few.

Alina Szmant

Note: *Szmant had one of CORALations' messages in her original message. The CORALations message appears above.*

From: "**CORALations**" <corals@caribe.net>
To: "Coral-List" <coral-list@coral.aoml.noaa.gov>, "Alina Szmant" <aszmant@rsmas.miami.edu>

Subject: Re: Acropora spp., endangered
Date: Fri, 26 Feb 1999 20:26:13 -0400

Dear Alina Szmant and Listers:

I'm sorry if you or anyone perceived my comments about Mr. Jaap's letter as "snotty". I don't know Walt Jaap...and meant nothing personal. I certainly apologize to him if he percieved my comments as an attack. It was not meant that way. His letter was posted with intent to foster discussions and I discussed. I would offer to buy you and Walt an apologetic beer at the next conference we mutually attend, but am afraid all the listers will start hurling insults just to try and cash in on my guilt reflex!

In my own defense...the quotes I commented on were directly taken from Mr. Jaap's letter specifically to avoid misinterpretations! Endangered Species Act is also binding in Puerto Rico and USVI's where, as you stated, there are still living stands of a. palmata. There are also many large dead a. palmata reefs. If this species was listed as Endangered we may be able to use this listing as a tool to protect reefs like the one you visited from some monstrously ecologically insensitive development. These developments are clearly not endangered. This may also prove a useful tool in the fight for better water quality.

I never implied Walt "made" any Endangered Speicies criteria up. This is unfair.

You make the comment these species don't fit the Endangered Species criteria based on recruitment and I thank you for listing that criteria.. I think defending his points in relation to this criteria would have made Walt's letter stronger. this is just my opinion. Those questions I asked about endangered species act were not meant sarcastically....I was honestly interested in obtaining more information.

You wrote: "(a) is below reproductive/recuitment capacity in ALL it's range (and I just heard last night about great healthy stands of it in several places in the Bahamas), then they won't meet the specific guidelines to be designated as endangered species. In my opinion, based on what I've seen, theyt are not."

Could you or someone from this list define "below reproductive/recruitment capacity" and how a healthy stand may indicate this species does not qualify under this criteria. Does a healthy stand automatically imply new new recruits? How is this evaluated? Does this mean that as long as there are healthy stands they will never qualify??? (These are honest questions...not meant snotty. I am trying to learn here!)

Again, very sorry for any misunderstandings,

Sincerely,

Mary Ann Lucking
Project Coordinator
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Amapola 14, Suite 901
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phone/fax: 787-791-7372
corals@caribe.net

Note: *Lucking had Aszmant's message in her original message. Aszmant's message appears above.*

From: "**J. Charles Delbeek**" <delbeek@hawaii.edu>
To: coral-list@coral.aoml.noaa.gov
Subject: Re: Acropora spp., endangered
Date: Sat, 27 Feb 1999 18:37:09 -1000

I too am somewhat confused as to what additional protection placing Acroporids on the ESA will accimplish that is not already being covered. Could someone who is supporting this idea please outline the additional protection thus afforded and how this is of benefit compared to legislation already in place?

I am also perplexed as to how the ESA will protect corals from natural disasters such as hurricanes, or from other affects attributed to coral bleaching i.e. increased surface temperatures?

It is somewhat ironic that while many consider Acroporid species "endangered" in Florida, current legislation makes it extremely difficult to obtain collection permits to maintain and cultivate these species in captivity.

J. Charles Delbeek M.Sc.

Aquarium Biologist
Waikiki Aquarium
University of Hawaii

"The fact that my physiology differs from yours pleases me to no end."
Mr. Spock

From: "**J. Charles Delbeek**" <delbeek@hawaii.edu>
To: coral-list@coral.aoml.noaa.gov
Subject: Re: Acropora spp., endangered
Date: Sat, 27 Feb 1999 18:44:34 -1000

Mary Ann's questions bring up an interesting dilemna I think. How does one go about measuring recruitment fitness for a potential ESA listing when said organism releases billions of gametes? Was the ESA ever designed to deal with such a fecund organism or was it more for the "warm and fuzzies" than the image challenged?

J. Charles Delbeek M.Sc.

Aquarium Biologist
Waikiki Aquarium
University of Hawaii

"The fact that my physiology differs from yours pleases me to no end."
Mr. Spock

From: "**CORALations**" <corals@caribe.net>
To: "J. Charles Delbeek" <delbeek@hawaii.edu>,
<coral-list@coral.aoml.noaa.gov>
Subject: Re: Acropora spp., endangered

I've been considering this and listed some examples:

I previously stated how this could be a useful tool to stop a development which may impact offshore areas where the listed species is found, or possibly be used to push legislation for stricter clean water standards...and since posting these comments, have come up with a number of other things. Endangered Species Act loses its "warm and fuzzy" aspects in court*, during public hearings...when commenting on Environmental Impact Statements for developments, when pushing for protective legislation which can protect spawning grounds etc....Federal courts pay attention to Endangered Species Act.

I don't think any one would challenge your comment that ESA , or any "coral reef" legislation would be effective at protecting corals from natural disasters...but if it can be used to minimize anthropogenic impacts, wouldn't it help reef damaged by such disasters recover?

I think captive propogation of corals may also prove useful...to an extent...if well managed. However, good management means restrictions. It should be difficult to obtain a permit for collection in a species that as you wrote many seem to consider "endangered". Collection should also be one of the easiest anthropogenic stresses to control...but I have doubts as to if even this protective legislation is effective. Not to say it should be thrown out....Just to say we should take inventory of what management works and does not work .....and discuss topics like this.

Why not list? Do we have the data to support? What does recruitement capacity mean?
(*.....hope I don't sound mean..comments not meant that way)

Note: *The writer of this CORALations had Delbeek's message in the original message. Delbeek's message appears above.*

From: "**Jamie D. Bechtel**" <warrior@bu.edu>
To: coral-list@coral.aoml.noaa.gov, lesk@bio.bu.edu
Date: Sun, 28 Feb 1999 11:06:13
Subject: Acropora spp., endangered -legal background

hello all - i have been following the debate with some interest and thought some background information may be helpful. there is an excellent article discussing the role of science in the listing of endangered species. Bogert, Laurence Michael "That's my story and i'm sticking to it: is the best available science any available science under the endangered species act." 31 Idaho Law Review 85 (1994).

despite some recent flexibility mechanisms built into the ESA, it remains a strong legislative tool. the endangered species act (ESA) is unique in terms of environmental legislation in that it contains a flat, substanative prohibition. weighing heavily in favor of the application of the endangered species act is the fact that, beyond a shadow of doubt, congress intended to grant high priority status to endangered species. consequently, the ESA remains a strong legislative tool and is upheld uniformily and

consistently in district courts.

Sec. 7 of the ESA supplies much of the force of the ESA in "insur[ing] that actions authorized, funded, or carried out by [federal deptarments and agencies] do not jeapardize the continued existence of such endangered species and threatended species or result in the destruction or modification of habitat of such species which is determined by the Secretary, after consultation as appropriate with the affected States, to be critical".

in short, if a project will cause harm to an endangered species, that project can likely be brought to a relatively quick halt. 1n 1995, sec 9 (regarding illegal taking species w/i the US and the territorial sea) of the ESA won its day in court. the supreme court allowed the definition of "harm" to include "significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering (babbit v. Sweet Home Chapter of Communities for a Great Oregon, S. Ct. US 1995)

it should be noted that, while application of the ESA is unlikely (not impossible) to improve current water quality and habitat conditions, it could go along way in preventing further decline(although some interesting battles are coming up with regards to language in the esa to promote conservation of species). the law was not designed to determine protective measures for different reproductive behaviors. it is likely that we do not need to consider recruitment fitness. (criteria listed below)

it should also be noted that in determining whether a population is threatened, it need not be threatened globally, but throughout a portion of its range. many examples exist, such as the protection of the bald eagle in US domestic populations despite a thriving population in Alaska. distinct population segments can be protected. this arguement is likely to be stronger when additional populations occur outside US states and territories but are threatened within the US.

the esa also allows critical habitat to be protected - slightly more complicated to achieve but based on an endangered species listing.

the application of esa relies solely on the "best scientific and commercial data available." the act allows that listing of a species as endangered or threatend follows certain criteria: if the species experiences 1. present or threatened destruction or modification of its habitat or range. 2. overutilization for commercial, recreational, scientific, or education purposes 3. disease/predation 4. inadequacy of existing regulatory mechanism or other natural or manmade factors affect its continued existence

listing of an organmism that is not truly endangered can be extremely dangerous in providing fuel for politicians and industry trying to bring an end to the act.

final thoughts, the legal arena is constantly changing and many questions regarding application of the ESA remain untested until they appear in court.

one thought permeating the legal environment is the idea that scientist don't agree on any thing and data is untrustworthy. unfortunately, a few bad apples etc... however, as a scientist interacting in the legal community, i find it disheartening to have to constantly defend the workings of the scientific community. any suggestions on how to begin dispelling the myth and providing explanation?

hope this information is helpful -

cheers,
jamie

Jamie D. Bechtel
Boston University
Graduate School of Biology
5 Cummington Street
Boston, MA 02215

Jamie D. Bechtel
Boston College School of Law
885 Centre Street
Newton, MA 02159

From: **George Garrett** <garettg@mail.state.fl.us>
To: "coral-list@coral.aoml.noaa.gov" <coral-list@coral.aoml.noaa.gov>
Subject: FW: Acropora spp., endangered
Date: Sun, 28 Feb 1999 11:35:01 -0500

-----Original Message-----
From: Garrett-George
Sent: Friday, February 26, 1999 11:13 PM
To: 'Bob Steneck'
Subject: RE: Acropora spp., endangered

Bob and Coral-List:

Having had the pleasure of working on both upland and marine management issues, I find this debate to be rather interesting. Though I think that there are arguments for listing, I'm not sure how much it accomplishes as compared to the regulations currently in place (particularly as defined by Walt). I don't believe that the ESA is particularly strong and I don't consider myself to be a "rabid foamy mouth" on the issue.

In Florida and other parts of the United State or its protectorates, harvest or coral is not allowed - period. I think that Walt made a good argument for that. Touching coral or creating relatively minor disturbances can be a problem, and though a contributor to coral decline by some accounts, is probably not the major one. Mind you, I don't believe that the ESA would bring much to bare on this problem either. Regardless of the law, it is ultimately an on the water enforcement issue, dealt with under the prevailing political climate.

First, I have great respect for the ESA and the many refuges that have been established to protect ETS. There are four wildlife refuges in the Florida Keys. However, and Ah ha, a good opportunity for comparative study. If petting Key deer is the comparative equivalent of touching coral, people do it on Big Pine Key all the time. The refuges discourage it, but reasonably can't STOP it. It's that perception of heavy handed enforcement thing.

One more step. It took a third party federal law suit to get FWS to force FEMA to consult with them when issuing flood insurance policies in the Keys (or other flood prone areas with ETS).

Taking this a step further, the fact that insurance policies are being issued indicates a significant impact on the habitat of an endangered species through development of the units requiring insurance. Pineland and hardwood hammock is disappearing daily, though because of local regs, this impact is declining significantly (admittedly influenced and assisted by the ESA). But, development is still allowed in developed subdivisions that contain little habitat - flat in the middle of the Key Deer Refuge.

It's probably not fair to dump this on FWS, particularly on Big Pine Key - the die was cast there before FWS had a Refuge. Platted lots have existed there for a long time and funding for purchase is limited. However, let's look at the concept of an "Incidental Take Permit" (ITP) or an "Habitat Conservation Plan" (HCP). At the time that I worked on the HCP for Key Largo (crocodile, woodrat, cotton mouse, indigo snake) there were probably 4 other HCPs in existence (in a time period spanning the mid 70s to mid 80s). That was about 15 years ago. Since that time I've dealt more in marine matters and have lost count, but there are literally hundreds of HCPs now. At least one view of an HCP is that it is a compromise between what you want for the ETS and what interested developers want from their land. Frequently, this is a compromise garnered from an inability to adequately enforce the ESA, the drives of those who want to develop, and the strength of the Constitutional "Takings" law (Takings in this sense being property rights and land use). I think you can make similar arguments for ITPs, though perhaps not as strongly because they don't tend to affect as broad a part of the range.

I think many of the reasons that the ESA has not been applied more effectively in marine environments (marine mammals and reptiles being the exception) is that reproductive dispersal is perceived to and in fact probably tends to be broad. Walt alluded to this. The coral species being discussed, particularly the Acroporids, are pan Caribbean (and Pacific, etc.) Thus, the ESA would consider this in the listing process and conversely, if listed would not affect these species anywhere but in U.S. states and territories. These are places where they are well protected.

In any event, between the State of Florida (in this case), the various Fisheries Acts, and the FKNMS, the Keys are afforded a fair amount of protection. I don't honestly know how much more protection could be afforded them.

Having played devils advocate for the last page or so, I certainly don't oppose listing the Acroporids. However, don't expect any panaceas. Its typically the bigger things that are not accounted for in such laws, and probably never will be effectively, that impact our reefs - the Mississippi or the Orinoco, global warming, Saharan dust (that one's for you Gene), and atmospheric deposition. More locally and more tangibly (for Florida), its wastewater outfalls on the east coast, phosphate mining on the west coast and general conditions of coastal eutrophication. We've gotten too big for the place in which we live.

We will continue to fight the good fight and do the best we can. Let's list the Acroporids, who knows it may bring greater attention to the things that aren't so heavily regulated.

George Garrett
Director of Marine Resources
Monroe County, Florida Keys

PS Regarding the existing laws and least, Walt (and I) argue from the stand point of the laws of Florida, as described above. I do recall some recent permits in Hawaii for marina development in which a

significant area of coral was allowed to be destroyed - though, with significant transplant of some as mitigation). Is there a stronger need for concern nationally, in the Pacific or even Puerto Rico (ref. CORALations)?

Note: *Garrett had Bob Steneck's entire second message in his original message. Steneck's second message appears above.*

From: **Eric Borneman** <EricHugo@aol.com>
To: delbeek@hawaii.edu, coral-list@coral.aoml.noaa.gov
Subject: Re: Re: Acropora spp., endangered
Date: Tue, 2 Mar 1999 13:02:32 EST

Hi Charles.

<<I too am somewhat confused as to what additional protection placing Acroporids on the ESA will accimplish that is not already being covered. Could someone who is supporting this idea please outline the additional protection thus afforded and how this is of benefit compared to legislation already in place?>>

I think Jamie outlined some good points in his previous post on this. While there may be geological evidence pointing to boom/bust cycles in various coral populations (and there is), the points brought out earlier I think are important: that is, that irrespective of natural catastrophe and influence, the anthropogenic influence of many factors seems unrelenting. There have been many papers which have investigated long and short term damage resulting from various natural factors, and, while occasionally catastrophic and reefs are largely lost, the majority seem to show slow or even surprisingly quick recovery given proper conditions. However, recovery in stressed or injured animals is remarkably less as energy is allocated to repair. I cannot really see what harm placing A. palmata and A. cervicornis under ESA guidelines would do, as these stressed communities could potentially benefit from any and all action on their behalf. What concerns me (besides the fact I miss seeing vast thickets of Acropora in the Caribbean) is the reef accretion rate without these reef builders. Unlike Pacific reefs, there are fewer species which can grow at the rate or in the conditions tolerated by these two species than in the Pacific. With bioerosion, continued anthropogenic stress, and natural disasters (which, arguably, may worsen in the future), will the next in line reef-builders like Montastrea and Porites be able to keep up? Looking at the listing of some of the others (Dendrogyra cylindrus, etc.), can Caribbean reefs keep up? Only coralline algae ridges to come? ESA won't do a thing to prevent Gaia's wrath, but there is quite a difference between the natural cycles of disturbance and the continuing long term stress on the these reefs.

One thing I have noticed when such debates occur is that there is much "voire- diring" about whether proposed solutions are ideal or optimal...they rarely are. However, in the meantime, the habitat continues to suffer while the debate continues. Perhaps actions which protect the habitat should be implemented, even if not panacaeic, while better solutions are being worked on?

Nor am I particularly convinced that a spawn releasing (hypothetically) one billion gametes is enough. Consider an equally hypothetical 1% successful fertilization, 1% settlement success, and a 1% chance of living past the juvenile stage. Then consider that 95% of these corals are lost (being lost) due to disease/stress/injury/predation, bioerosion, competition, etc. As was mentioned, recruitment is not

keeping up, so I think its more than a case of the "warm and fuzzies". Ordinarily, one could expect for fragmentation to make up some ground, but there aren't enough colonies around to make this of significant value...hence the reason why these species are now considered for ESA protection. The potential for these animals to recover and survive mass mortality is certainly there if conditions are ideal....but they aren't. Not that I am bringing up any particularly earth shattering points here, but it would seem that the loss of these key species is of particular importance to reefs, and I cannot see why all efforts to protect them shouldn't be supported. There is not really any economic value placed on them due to rigorous anti-collection protocol (as you brought up), and hence no real force towards *not* implementing protective legislation. Thus, arguably, their most important economic value is in their continued presence for recreational/tourism reasons and supporting the lower end of sport/food fish webs (and, of course, their intrinsic value to the reef itself and to the continued grants for studying the reasons for their mortality <g>)

I do, however, totally agree that efforts on the part of the public and private aquaria arena could (perhaps surprisingly) support some captive grow- out for replenishment. I have long thought that Caribbean species should be available for such efforts with careful and moderated collection.

Eric Borneman

From: "**Precht,Bill**" <BPrecht@kennesaw.Lawco.com>
To: "Jamie D. Bechtel" <warrior@bu.edu>, coral-list@coral.aoml.noaa.gov,lesk@bio.bu.edu
Subject: RE: Acropora spp., endangered ?
Date: Wed, 3 Mar 1999 11:46:31 -0500

Dear list:

For what its worth, just a few comments (in a question - answer format) about the spirited Acropora debate.

Q.- Should Acropora spp. be considered for listing?

A. - YES

Q. - What's the evidence for this?

A.- In most US waters (Caribbean & western Atlantic), Acropora populations have been drastically reduced by a number of factors (disease, storms, bleaching, predation, etc...) over the course of the last two decades. This is especially pronounced for Acropora cervicornis.

Q. - Is this reduction just part of natural boom-bust cycles in the local populations. Walt Japp makes some good points about the volatility of Acropora populations in Florida.

A. - Yes, Acropora populations are very volatile. However, the recent declines are not just confined to local populations within individual reefs or reef areas, but have impacted essentially all Acropora populations throughout the region. This includes reef areas far from population sources and major anthropogenic impacts. Belize, Bonaire, Jamaica, the Bahamas, Florida, etc... have all shown similar declines over roughly the same period of time. Florida reefs have been especially impacted. In addition,

recent geologic evidence strongly points to the fact that a "regional" decline in acroporid populations is without historical precedence in the Quaternary.

Q. - Okay, so some Acropora populations have diminished, but there are still some pretty good stands of Acropora spp. here and there. Why should we list a species that is still locally abundant in some areas?

A. - Your right, there are some pretty good stands of Acropora here and there, especially A. palmata. The main point being "here and there". Unfortunately, there aren't that many "here and there's" anymore. As compared to 20-30 years ago even these large stands are greatly reduced in size and number. This is based on both solid data and anecdotal evidence. In addition, even in these large stands, very few are "healthy"; that is they show a high incidence of partial mortality. For instance, one of the most beautiful and most luxuriant stands of A. palmata (just two years ago) was off Goulding Cay (southwest tip of New Providence Island, Bahamas). Many of these corals (over 50%) have died within the last year due to the 1998 bleaching event, white-band disease epizootics, and predation by mobile fauna. Many of these corals are now standing dead in-situ. This scene is being played over and over again throughout the region. It should be noted that this same reef at Goulding Cay was renowned for its prolific stands and thickets of A. cervicornis. This reef was used as a backdrop for numerous u/w scenes in films, including some James Bonds flicks. Stuart Cove the local dive operator there told me that ~ 99% of this staghorn vanished in the early to mid-1980's. Now it seems as though the A. palmata is imperiled there as well.

Q. - Well you've convinced me that the acroporids are at risk (maybe). How would implementing the E & T Species Act help here? Aren't the scleractinia are already protected in US waters by a host of various regulations and statutes?

A. - The present regulations protect corals from harvest and/or destruction in place (i.e. ship-groundings, anchor damage, etc...) Although illegal coral collection by reef poachers is still common and problematic, the E & T Act goes one step further in that it helps protect the habitat in which that species lives. This is done by designating "critical habitat" for a particular E & T species. Also, additional layers of legal protection are common with E & T species. For instance, The Bald Eagle is protected by the Migratory Bird Act, as well as the E & T Act, plus individual State Statutes. Having an additional layer of protection and the legal ramifications that go with it (violation of the E & T Act is very serious business) will not just help the acroporids but all corals living in association with them.

Q. - It may be determined that only local populations of acroporids are at risk. If so, why place the whole lot on the list?

A. - If this is determined to be the case (based on population data), then there are numerous options available. This includes the listing of a species as "a species of special concern" (i.e. the Burrowing Owl in Florida). Another option, would be (as Jamie Bechtel noted) to list only a local population as E or T. For instance "All Acropora spp. in the waters of Florida" or "All A. cervicornis in US Territorial waters" or "All acroporid species in US waters with exception of A. palmata in Florida" and so on. The E & T Species Act even protects species because of their similarity with other like species. For example, the Florida alligator is protected because of its similarity with the American Crocodile, an endangered species.

Q. - Will placing the Acropora spp. on the list make getting scientific permits for collecting coral specimens more difficult.

A. - It should not affect those who have just reasons for sampling (permits are already required for

work/research in the Florida Keys), and it will certainly deter the unnecessary collection and sampling of these corals.

Well, this is my spin on some of the stuff that has been going around for the last couple of weeks. Hope this helps.

By the by, Rich Aronson and I recently completed a ms. on the history & volitility of the Acropora spp. as well as on their recent, regional demise. I would be more than happy to furnish copies of this in-press ms. to any that request it.

"Men with the muckrake are often indispensable to the well-being of society, but only if they know when to stop raking the muck." Theodore Roosevelt 1906

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Note: *Precht had Bechtel's entire message in his original message. Bechtel's message appears above.*

From: Les Kaufman <lesk@bio.bu.edu>
To: "Precht,Bill" <BPrecht@kennesaw.Lawco.com>
cc: "Jamie D. Bechtel" <warrior@bu.edu>, coral-list@coral.aoml.noaa.gov
Subject: RE: Acropora spp., endangered ?
Date: Wed, 3 Mar 1999 12:52:17 -0500 (EST)

Acropora cervicornis, prolifera, and palmata would in my estimation qualify for a "vulnerable" or higher listing, possibly as high as endangered, in accordance with IUCN criteria after Mace et al.

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From: "CORALations" <corals@caribe.net>
To: "Coral-List" <coral-list@coral.aoml.noaa.gov>
Subject: Fw: Illinois State Legislature has introduced a bill that will remove the eastern massasauga from ESA
Date: Mon, 8 Mar 1999 11:24:58 -0400

> From: Allen Salzberg <x5245@erols.com>
> To: asalzberg@aol.com
> Subject: Illinois State Legislature has introduced a bill that willremove the eastern massasauga from ESA
> Date: Monday, March 08, 1999 10:17 AM
>
> Gary Casper <gsc@mpm.edu>
> Subject: Urgent situation, Illinois de-listing endangered species
> Please re-distribute appropriately.
>
> ILLINOIS STATE LEGISLATORS PROPOSE DE-LISTING ENDANGERED SPECIES
>
> Members of the Illinois State Legislature have introduced a bill that will
> remove the eastern massasauga, brook lamprey, and Indiana crayfish from the
> list of IL threatened and endangered species. Sponsors are Kurt Granberg
> and Larry Woolard, who reportedly claim that these three species are
> "getting in the way" of development in their districts. The bill reportedly
> made it out of committee Wednesday by a large majority. The date for floor
> debate is unknown at this time.
>
> The IL DNR has distributed a position paper on this bill, coming out
> strongly against it.
>
> The precedent this bill would set, if successful, has implications for all
> rare species. If non-biologists are allowed to draft bills removing
> protected status for species without any supportive data showing recovery,
> simply in order to avoid compliance with endangered species laws, then
> endangered species laws become non-functional and useless.
>
> Letters are urgently needed. Letters can be written to any of the State
> Reps in Illinois, and letters from Illinois citizens will have the greatest
> impact. Others are certainly encouraged to write. The bill is HB 2243.
> Illinois legislator addresses and phone numbers are available at:
> http://www.state.il.us/legis/default.htm
>
> The bill has not gone to the senate yet, so letters should be sent to
> representatives, not senators, at this time.

From: **Kenyon Mobley** <gsi19453@gsaix2.cc.gasou.edu>
To: coral-list@coral.aoml.noaa.gov
Subject: more on ESA and bryozoans
Date: Mon, 8 Mar 1999 14:24:47 -0500

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The Palm Beach Post
March 6, 1999, Saturday, MARTIN-ST. LUCIE EDITION

SECTION: LOCAL, Pg. 1B
LENGTH: 613 words

HEADLINE: DREDGE HALTED BECAUSE OF RARE CREATURE

BYLINE: Jim Reeder, Palm Beach Post Staff Writer

DATELINE: FORT PIERCE

BODY:
Dredges pumping sand onto Fort Pierce's South Beach were stopped Friday by a federal judge who agreed the Army Corps of Engineers may not have done adequate environmental impact studies before starting the project.

U.S. District Judge Henry H. Kennedy in Washington issued a temporary injunction stopping the work until further hearings are held on whether the work should be stopped permanently.

St. Lucie County officials said the work stoppage will cost $ 50,000 to $ 80,000 per day in fees that must be paid to Weeks Marine Inc. of Camden, N.J., whether they're pumping sand or not.

"Our money will go to the contractor and we'll have nothing to show for it," County Commission Chairman Paula Lewis said. "The earliest we'll be able to resume work is probably February, 2001, and we'll have no money."

Dredges started work this week and had pumped about 100,000 cubic yards of sand onto the beach, Lewis said. Plans called for nearly 1 million cubic yards to rebuild the beach from the South Jetty to near Ocean Village condominium.

Two scientists and three environmental groups filed suit in Washington Monday seeking the project halt because the Army Corps of Engineers did no studies on the presence of 12 species of ocean creatures called bryozoans.

The only place the species have been found is Capron Shoal, the underwater sandpile 3.5 miles off Fort Pierce where the corps obtained sand to renourish the beach.

Such rare animals are entitled to special consideration under the Endangered Species Act, the suit said.

Kennedy heard arguments Thursday and issued his stop-work order Friday morning, attorney Eric Glitzenstein said.

"The judge said it appears likely we will prevail after further hearings," Glitzenstein said. "The corps says these species likely are found elsewhere, but they haven't looked for them."

Corps officials could not be reached for comment Friday.

I want to see the beach renourished, but I'm disappointed the corps didn't do adequate review of alternate sites and consider these species," Commissioner Doug Coward said.

Commissioner Cliff Barnes is angry opponents torpedoed years of work on the project.

"The allegation these creatures are rare or non-existent elsewhere is completely unsubstantiated," Barnes said. "Nowhere do the opponents say they looked a half-mile away or a mile away to see if these species are there.

"This may save these creatures . . . but it leaves our beaches unprotected through another hurricane season and reduces turtle-nesting areas."

The suit was filed by Judith E. Winston, a Martinsville, Va., researcher; North Beach resident Brian Kilday, who works at Harbor Branch Oceanographic Institute; the St. Lucie Audubon Society, Conservation Alliance of St. Lucie County and the St. Lucie Waterfront Council

Shoal harbors new bryozoan species

Bryozoans are tiny marine animals that live on grains of sand or in colonies between sand grains, seaweed and pilings. Nine new species and a new genus live on Capron Shoal off Fort Pierce.

HOW THEY LIVE: Imagine sand grains as giant boulders, water thick as honey and bits of food drifting by in the glop. Stormy weather stirs the sand, causing injury, death and damage.

WHAT THEY EAT: Bacteria and microscopic algae.

KEEPING CLEAN: When algae soils the colony, it sheds its outer layer.

SEX LIVES: They reproduce sexually and asexually.

LIFE SPANS: Unknown; believed short.

VALUE TO HUMANS: Part of ocean's water-cleansing filter system. Unexplored potential. Bryozoan relatives contain a potent anti-cancer agent used to treat lymphoma and leukemia.

Source: Judith Winston, scientist

NOTES:
Info box at end of text

GRAPHIC: MAP (C), MARK HEMPHILL/Staff Artist, Location Map of Capron Shoal

COMPANY: ARMY CORPS OF ENGINEERS (84%);

LOAD-DATE: March 8, 1999

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KBM

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lasted updated 10/07/99
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